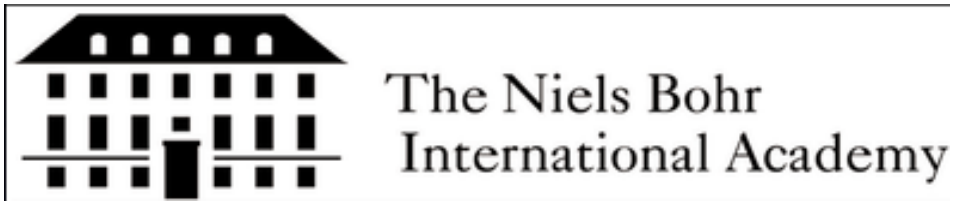

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Coincidence Measurements for Gerda Phase II

Thursday 26 June 2014 17:20 (20 minutes)

The Gerda experiment aims to find the Neutrinoless Double-Beta Decay (0nbb) in Ge76. Having concluded Phase I with a lower limit on the respective half-life which strongly disfavours the KK claim of 2004 [1][2][3], the experimental setup is currently changed to be suitable for Phase II. The modified setup will implement a new veto using the scintillation light of liquid Argon to reject background events and will be able to hold a higher detector mass as there are 30 new detectors ready for insertion. The Phase II detectors are of Broad Energy Germanium (BEGe) type which offers pulse shape analysis [4] as a powerful tool to further reduce the background. Hence, events with a topology that does not match the characteristics of 0nbb events can be recognized and efficiently rejected. To improve this technique an experiment is being set up at Laboratori Nazionali di Legnaro (LNL) implementing a BEGe test detector of depleted germanium and four coaxial detectors made of natural germanium. A collimated Cs137 source will be installed to illuminate the BEGe detector from below and the slit collimated coaxial detectors are facing the BEGe at an observation angle of 90deg. Coincident events in the BEGe and one coaxial detector at the energy of a single Compton scattered event are expected to have a single site event topology, thus matching the topology expected for a 0nbb event in Gerda. As the Cs137 source and the coaxial detectors are collimated a scan of the BEGe can be performed giving clean samples of signal like events which can be used to train a neural network or to build a pulse shape library in order to improve the pulse shape analysis technique. BEGe data from Gerda Phase I will be used to benchmark the newly developed technique and comparisons to pulse shape simulations will be performed. In this talk the setup, aim, tests and simulations done so far will be presented.

References

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